

WHAT IS CLAIMED IS:

1. A method of manufacturing a thin-film magnetic head, the head comprising: first and second magnetic layers each including a magnetic pole and magnetically coupled to each other, the magnetic poles facing each other with a gap layer in between and being to be faced with a recording medium; and a thin-film coil portion disposed between the two magnetic layers with an insulating film in between; the first magnetic layer including a first magnetic layer portion having a first uniform width portion that defines a track width, and a second magnetic layer portion extending a region where the thin-film coil portion is disposed and magnetically coupled to the first magnetic layer portion, the second magnetic layer including a second uniform width portion corresponding to the first uniform width portion of the first magnetic layer, the method comprising:

a first step of patterning a first magnetic material layer by reactive ion etching so as to form at least the first uniform width portion of the first magnetic layer;

a second step of selectively removing a region of the gap layer excluding a portion corresponding to the first uniform width portion of the first magnetic layer by reactive ion etching; and

a third step of patterning a second magnetic material layer by reactive ion etching so as to form at least the second uniform width portion of the second magnetic layer,

wherein in the first, second, and third steps, the reactive ion etching is performed in a gas atmosphere containing chlorine at a temperature ranging from 50°C to 300°C.

2. A method of manufacturing a thin-film magnetic head according to claim 1, wherein the reactive ion etching is performed at a temperature ranging from 150°C to 250°C.

3. A method of manufacturing a thin-film magnetic head according to claim 1, wherein a first mask formed of a predetermined inorganic material is used in the first step.

4. A method of manufacturing a thin-film magnetic head according to claim 3, wherein a material for forming the first mask contains aluminum oxide or aluminum nitride.

5. A method of manufacturing a thin-film magnetic head according to claim 3, wherein the step of forming the first mask including the steps of:

forming a mask precursor layer made of the inorganic material on a surface of the first magnetic material layer;

forming a second mask on a surface of the mask precursor layer; and

patterning the mask precursor layer with use of the second mask.

6. A method of manufacturing a thin-film magnetic head according to claim 5, wherein the first mask is formed by reactive ion etching.

7. A method of manufacturing a thin-film magnetic head according to claim 5, wherein a photoresist film pattern having a predetermined shape is formed on the surface of the mask precursor layer, and used as the second mask.

8. A method of manufacturing a thin-film magnetic head according to claim 5, wherein a metal film pattern having a predetermined shape is formed on the surface of the mask precursor layer, and used as the second mask.

9. A method of manufacturing a thin-film magnetic head according to claim 8, wherein the metal film pattern is formed by selectively plating the surface of the mask precursor layer.

10. A method of manufacturing a thin-film magnetic head according to claim 8, wherein the metal film pattern is formed by forming a metal layer on the surface of the mask precursor layer and selectively etching the metal layer.

11. A method of manufacturing a thin-film magnetic head according to claim 1, wherein in forming the first magnetic layer, the second magnetic layer portion is formed separately from the first magnetic layer portion by reactive ion etching.

12. A method of manufacturing a thin-film magnetic head according to claim 1, wherein the first magnetic material layer is formed by sputtering using a predetermined magnetic material.

13. A method of manufacturing a thin-film magnetic head according to claim 12, wherein the magnetic material contains iron nitride.

14. A method of manufacturing a thin-film magnetic head according to claim 12, wherein the magnetic material contains an amorphous alloy.

15. A method of manufacturing a thin-film magnetic head according to claim 14, wherein the amorphous alloy contains zirconium-cobalt-iron.

16. A method of manufacturing a thin-film magnetic head according to claim 1, wherein the first step is performed using a first mask formed of an inorganic material, and the second and third steps are performed using at least one of the first mask and the first uniform width portion as a mask.

17. A method of manufacturing a thin-film magnetic head according to claim 1 consisting of the first, second, and third steps which are consecutively performed in one process.